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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In the Matter of the Application of:

Wayne S. Davis

Serial No.: 08/014,911

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For: ELECTRICAL CONNECTOR WITH PROTECTION FOR ELECTRICAL
CONTACTS

Examiner: K. Nguyen Group Art Unit: 3202

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The Commissioner of Patents and Trademarks

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Brief
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BRIEF ON APPEAL

Enclosed in triplicate is Appellants' Brief On Appeal.
Please charge deposit account no. 23-1950 the fee of
\$280.00 for filing this Brief On Appeal.

STATUS OF CLAIMS

Claims 1, 3-9 and 11-19 are on appeal. Claim 2 is canceled. Claims 10 and 20 are allowed.

STATUS OF AMENDMENTS AFTER FINAL

An amendment under 37 CFR 116, filed December 15, 1994, has been considered, and would have been entered upon the filing of an appeal. See Advisory Action, paper no. 9, mailed January 6, 1995.

SUMMARY OF THE INVENTION

The invention comprises, (as referred to in the specification, page 3, lines 7-11, Figs. 1-6) an

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electrical connector (1) comprising: an insulative housing (2), conductive contacts (4, 5, 6) within an interior of the housing (2), wiping surfaces (61, page 9, lines 18-20, Figs. 1 and 7) on a mating end of the housing (2), conductive surfaces (60, page 10 line 35- page 10, line 6) on the contacts (4, 5) being rearward of the wiping surfaces (61) and offset laterally of the wiping surfaces (61) to engage unwiped surface areas of mating contacts (page 10, lines 20-35) of another, mating connector, which mating contacts wipe against the wiping surfaces (61) prior to engagement of the unwiped surface areas of the mating contacts with the conductive surface areas (60) of the contacts (4, 5, page 11, lines 4-30) the wiping surfaces (61) projecting along paths of mating insertion of the contacts (4, 5), and being interposed between the contacts (4, 5) and a front edge of the housing (2).

Although wording in a claim on appeal is used for a summary of the invention, the claim is intended to cover other embodiments and modifications of the claimed invention, and is intended not to be limited in scope of patent protection by its use of the claim for the summary of the invention.

ISSUES

ISSUE NUMBER 1. Whether Claims 1, 3, 4, 6-9 11-14 and 16-19 are unpatentable under 35 USC 103 over Roberts, Olsson or Buchter et al in view of Asick et al.

ISSUE NUMBER 2. Whether Claims 5 and 15 are unpatentable over the references as applied to claim 1 and 11, and further in view of Yamamoto.

GROUPING OF CLAIMS

Claims 1 and 4 stand or fall together. Claims 1 and 9 stand or fall together. Claims 11 and 14 stand or fall together. Claims 11 and 19 stand or fall together. The remaining claims do not stand or fall together. Each of

said remaining claims is separately patentable for respective reasons that appear in the argument, below.

ARGUMENT

ARGUMENT WITH RESPECT TO ISSUE NUMBER 1; Whether Claims 1, 3, 4, 6-9 11-14 and 16-19 are unpatentable under 35 USC 103 over Roberts, Olsson or Buchter et al in view of Asick et al.

As stated in the Final Rejection,

"It would have been obvious ... to provide ramp wiping surfaces on a mating end for each of the prior art connector housings (Roberts, Olsson, or Buchter et al.) in view of Asick's teachings of front ramp wiping surfaces which are offset laterally from conductive contact surfaces 80. The front wiping surfaces as taught by Asick et al. would provide wiping for only outside edge portions of each contact of a mating connector for the prior art connector housings prior to contact engagement."

In reply, each of Claims 1, 6, 7, 12, 16 and 17 is separately patentable because, no reference or combination of references, teaches that which is recited in each of the Claims, of wiping surfaces being offset laterally with respect to rearwardly located surfaces of contacts, and being interposed between such contacts and a front edge of a housing.

In Buchter the surfaces of the contacts and the lifting surfaces 100 coextend when in alignment with one another, and are not offset laterally with respect to one another. See Fig. 1. In the cited reference Asick et al., the contact 80 extends past the cam profiles 78 to a front edge of a circuit board 60. One skilled would not have interpreted Asick et al., to teach that the cam profiles 78 are interposed between the contact 80 and a front edge of the circuit board 60. The cam profiles 78 are only

parallel to the contact 80 without being interposed between the contact 80 and a front edge of the circuit board 60. This difference between the invention and the devices disclosed by the references provides an important advantage, as stated in the specification, page 11, lines 31-35;

"An advantage of the invention resides in a connector 1 with tips of contacts 4, 5 being recessed from a mating end 12 of the connector 1 and covered by insulative material that provides ESD protection for the contacts 4, 5."

The meaning of ESD protection is explained in the specification, at page 1, lines 27-35;

"A desirable shielded connector provides ESD protection for the electrical contacts of the connector during mating connection of the connector with another, mating connector. During mating connection of two mating connectors, an electrostatic voltage charge on one or both of the connectors should be discharged to ground electrical potential via the shield on one or both of the connectors, whereby the voltage charge is shunted away from electrical contacts in the connectors."

The specification, at page 2, lines 2-6 states:

"A feature of the invention resides in a shield covered connector with tips of electrical contacts being recessed from a mating end of the connector, and being covered by insulative material that provides ESD protection for the contacts."

The specification describes the claimed wiping surfaces, at page 9, line 18, through page 10, line 19.

The Final Rejection further cites Roberts and Olsson as primary references. The Final Rejection does not point

out any corresponding features in Roberts and Olsson that would have been combined with Asick et al., in any way different than the combination of Buchter et al. with Asick et al. The Official Action does not describe features in each of Buchter et al., Roberts and Olsson that would make them applicable as primary references. It would appear that the rejection based on the combination of Asick et al., with Roberts and Olsson is cumulative of the rejection based on the combination of Asick et al. with Buchter et al.

It is noted that Fig. 4 of Olsson shows contacts with contact face sections 50 that extend along channels 20. Each of the contact face sections 50 extends past the insulation to a front edge of the connector. Thus, the insulation is not interposed between the sections 50 and the front edge of the connector. No ESD protection advantage provided by such insulation would have been suggested by Olsson. In Asick, the contact 80 extends past the cam profiles 78 to a front edge of a circuit board 60. One skilled would not have interpreted Asick to teach that the cam profiles 78 are interposed between the contact 80 and a front edge of the circuit board 60. Thus, modification of Olsson by Asick would not have suggested the recitals in Claims 1, 6, 7, 12, 16 and 17.

In Roberts, Fig. 9, trough like recess 37 extends into a front edge of the connector housing portion 22, Figs. 4 and 9 of Roberts discloses a connector having contacts having ears 60 at the tips that extend along recesses 82 in insulation. The insulation does not provide wiping surfaces against which mating contacts wipe before prior to engagement of unwiped surfaces on the mating contacts with the contacts having the ears 60. The insulation is not interposed between the ears 60 and the and a front edge of the connector. No ESD protection advantage provided by such insulation would have been suggested by Roberts.

One skilled would not have interpreted Asick to teach that the cam profiles 78 are interposed between the contact 80 and a front edge of the circuit board 60. Thus, modification of Roberts by Asick would not have suggested the recitals in Claims 1, 6, 7, 12, 16 and 17.

Each of Claims 3, 11 and 13 is separately patentable. In the rejection of previously allowed claims 3 and 13, Roberts and Olsson and Buchter et al. are relied upon as primary references.

With respect to claims 11 and 13, each claim recites a feature of a conductive shield surrounding a mating end of the housing, and wiping surfaces on the mating end of a recited housing, and the wiping surfaces being closer to the shield than the contacts. In Olsson the channels 20 containing the contacts 52 extend into the front edge of the connector housing 4, which means that the contacts 50 extend closely to a conductive shield at the front edge of the connector housing 4. Olsson does not disclose wiping surfaces on insulation.

In Asick et al., the conductive contact 80 extends past the insulating cam profiles 78 to a front edge of a circuit board 60, which means that the cam profiles 78 are not closer to the front edge than the contact 80. The cam profiles 78 are only parallel to the contact 80, without being closer to a front edge of the circuit board 60 than the contact 80. Thus Asick et al., combined with Olsson, would not have taught one skilled how to provide wiping surfaces on a housing mating end that are closer to a shield than contacts.

Neither Roberts nor Asick teaches connectors with a conductive shield, and when combined, as references, would not have taught one skilled how to provide wiping surfaces on a housing mating end being closer to a shield than are recited contacts.

Buchter et al. discloses, in Figs. 5A and 5B, contacts that wipe against insulation material on a housing mating end. The Final Rejection states that Asick et al. teaches front ramp wiping surfaces which are offset laterally from conductive contact surfaces 80.

Asick et al. discloses, Fig. 7, column 3, lines 41-48, that cam profiles 78 are provided on the circuit board 60 to prevent undue wear of a circuit 80 as well as prevent accidental abutting which might tend to drive the circuit 80 from the circuit board 60. The structure taught by Asick et al. is to prevent wear of a circuit 80 or accidental driving of a circuit 80 when the circuit extends to a front edge of a circuit board. Thus, the cam profiles of Asick et al. prevent wear of the contacts or driving of contacts, when the contacts extend to a front edge of a circuit board.

The purpose of the Asick et al. cam profiles are for a purpose that is different from that of the Claims 11 and 13 on appeal. Each of Claims 11 and 13 recites conductive surfaces on the contacts being rearward of the wiping surfaces, and the wiping surfaces being closer to a shield than are the contacts. In Asick et al., the contact surface 80 extends to a front edge of a circuit board.

Asick would have taught one skilled to provide cam profiles 78 and a conductive contact 80 extending past the cam profiles 78 and the contact 80 being closer to the shield 84 than are the insulating cam profiles 78. Thus, one skilled would have been taught to modify Buchter et al. with contacts being closer to a shield than are insulating cam profiles.

In addition, Asick et al., refers to structure on a circuit board, and not on a connector. One skilled would not have adapted structure on a circuit board to modify a connector, especially when the connector 26 of Asick et al. has contacts that extend out to the front edge, which

connector has none of the structure on a connector that is recited in Claim 13.

With respect to Claim 3, the Claim recites wiping surfaces above a flange on a mating end of the housing, and the contacts being rearward of the flange. Claim 3 recites that the contacts engage unwiped surface areas of mating contacts. In Buchter et al., Figs. 5A, 5B, 5C, the mating contacts 40' wipe insulating material 100 in front of the contacts 82. The only way in which the prior art teaches that unwiped surfaces will be attained, is by extending the contacts 80 past the cam profiles 78, as taught by Asick et al. Thus, claim 3 is the only teaching of attaining unwiped contact surfaces on mating contacts when a flange ~~on~~ mating end of a housing provides ESD protection for contacts.

Each of Claims 8 and 18 is separately patentable, and recites the wiping surfaces covering front tips of the contacts. In Buchter the contacts are in recesses, but are not covered. In the reference Asick et al., the contact 80 extends past the cam profiles 78 and to a front edge of a circuit board 60. Also, the contact is uncovered, especially at a front edge of the circuit board 60, where a front of the contact 80 is narrowed, so as to extend between the cam profiles 78, and not to be covered by the cam profiles 78. The narrowed front of the contact 80 is particularly shown in Fig. 5, as extending to the front edge of the circuit board 60. One skilled would not have been suggested by Asick et al., that the front tips of the contacts in Buchter et al. or Olsson or Roberts are to be covered.

With respect to Claims 8 and 18, the recited wiping surfaces cover front tips of the contacts. In Olsson the channels 20 are open at their ends, which prevents covering of the front tips of the terminals 6. Similarly, in Asick et al., the channels 34 are open at their ends, which

prevents covering of the front tips of the terminals 36 and 38. In Roberts, the recesses 82 are open at their ends, which prevents covering of the front tips of the contact ears 60. In Buchter et al., the contacts 74, 76, 78, Fig. 2, extend along open recesses, which prevent covering of the front tips of said contacts.

ARGUMENT WITH RESPECT TO ISSUE NUMBER 2; Whether Claims 5 and 15 are unpatentable over the references as applied to claim 1 and 11, and further in view of Yamamoto.

The Yamamoto reference discloses pin shaped contacts 32, 80, and socket type contacts 36, 82. The structural features recited in each of Applicant's claims 5 and 15, comprise, an insulative divider separating one of the contacts from another of the contacts of each pair of the contacts, at least one conductive power contact having a pair of contact fingers on opposite sides of the divider, the contact fingers having a surface area sufficiently broad to radiate heat from electrical power dissipation, and the fingers extending parallel to the contacts. Neither the Yamamoto pins nor the Yamamoto sockets has contact fingers on opposite sides of an insulative divider.

The reason for citing Yamamoto is unclear from the Final Rejection that states;

".... Yamamoto is not relied upon to show such features. Such features are well known and shown by the primary references."

It is fair to conclude that no particular feature in Yamamoto is being relied upon in the Final Rejection for the basis of a rejection of the features recited in claims 5 and 15. Turning now to the primary references, no particular feature in Asick et al., is being relied upon in the Final Rejection for the basis of a rejection of the features recited in claims 5 and 15. In Asick et al., the terminals 36 and 38 are individual terminals, with individual contact arms 98. Not only do the contact arms

98 belong to separate individual terminals, but they also directly oppose each other without being on opposite sides of an insulative divider. None of the terminals 36 and 38 comprises, at least one conductive power contact having a pair of contact fingers on opposite sides of an insulative divider, as recited in the Claims 5 and 15 on appeal.

No particular feature in Buchter et al., is being relied upon in the Final Rejection for the basis of a rejection of the features recited in claims 5 and 15. In Buchter et al., each of the individual contacts 40 extends along a corresponding single cavity that does not extend to opposite sides of an insulating divider. None of the individual contacts 40 comprises, at least one conductive power contact having a pair of contact fingers on opposite sides of an insulative divider, as recited in the Claims 5 and 15 on appeal.

No particular feature in Roberts et al., is being relied upon in the Final Rejection for the basis of a rejection of the features recited in claims 5 and 15. In Roberts, each of the individual contacts 46 extends along its own corresponding single cavity that does not extend to opposite sides of an insulating divider. None of the individual contacts 46 comprises, at least one conductive power contact having a pair of contact fingers on opposite sides of an insulative divider, as recited in the Claims 5 and 15 on appeal.

In Olsson, each of the individual terminals 6 is separate from all other terminals 6, and extends along a separate channel 20 on solely one side of an insulator. None of terminals comprises at least one conductive power contact having a pair of contact fingers on opposite sides of an insulative divider, as recited in the Claims 5 and 15 on appeal.

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In view of the above argument, none of the references, individually or combined with Yamamoto would have suggested to one skilled the features recited in claims 5 and 15.

In view of the arguments presented above, reversal of the Final Rejection is requested.

Respectfully submitted,

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APPENDIX OF CLAIMS ON APPEAL

1. (Amended) An electrical connector comprising: an insulative housing, conductive contacts within an interior of the housing, wiping surfaces on a mating end of the housing, conductive surfaces on the contacts being rearward of the wiping surfaces and offset laterally of the wiping surfaces to engage unwiped surface areas of mating contacts of another, mating connector, which mating contacts wipe against the wiping surfaces prior to engagement of the unwiped surface areas of the mating contacts with the conductive surface areas of the contacts, the wiping surfaces projecting along paths of mating insertion of the contacts, and being interposed between the contacts and a front edge of the housing.

3. (Amended) An electrical connector comprising: an insulative housing, conductive contacts within an interior of the housing, wiping surfaces above a flange on a mating end of the housing, conductive surfaces on the contacts being rearward of the wiping surfaces and offset laterally of the flange to engage unwiped surface areas of mating contacts of another, mating connector, which mating contacts wipe against the wiping surfaces prior to engagement of the unwiped surface areas of the mating contacts with the conductive surface areas of the contacts, [An electrical connector as recited in claim 1, wherein,] the conductive [surface area] surfaces on each contact being [is] between edge margins on each contact, and the wiping surfaces [are] being offset from the conductive surface areas on the contacts, and [are] being in alignment with the edge margins on the contacts.

4. An electrical connector as recited in claim 1, wherein, an insulative divider separates one of the contacts from another of the contacts of each pair of the contacts.

5. (Amended) An electrical connector as recited in claim [4] 1, further comprising: an insulative divider separating one of the contacts from another of the contacts of each pair of the contacts, at least one conductive power contact having a pair of contact fingers on opposite sides of the divider, the contact fingers having a surface area sufficiently broad to radiate heat from electrical power dissipation, and the fingers extending parallel to the [signal] contacts.

6. An electrical connector as recited in claim 1, wherein, the wiping surfaces are interposed between the contacts and a front edge of the housing, and conductive shielding encircles the housing, a front edge of the shielding being closer to the front edge of the housing than the contacts.

7. An electrical connector as recited in claim 1, wherein, front tips of the contacts are recessed from a front edge of the housing, and the wiping surfaces are interposed between the tips of the contacts and the front edge of the housing.

8. An electrical connector as recited in claim 1, wherein, the wiping surfaces cover front tips of the contacts.

9. An electrical connector as recited in claim 1, wherein, the wiping surfaces are ramps.

11. (Amended) An electrical connector comprising: an insulative housing, conductive contacts within an interior of the housing, wiping surfaces on a mating end of the housing, conductive surfaces on the contacts being offset laterally of the wiping surfaces and being rearward of the wiping surfaces to engage mating contacts of another, mating connector, which mating contacts pass the wiping surfaces prior to engagement with the conductive surfaces, and a conductive shield surrounding the mating end of the

housing, the wiping surfaces being closer to the shield than the contacts.

12. An electrical connector as recited in claim 11, wherein, the wiping surfaces project along paths of mating insertion of the contacts, and are interposed between the contacts and a front edge of the housing.

13. (Amended) An electrical connector comprising: an insulative housing, conductive contacts within an interior of the housing, wiping surfaces on a mating end of the housing, conductive surfaces on the contacts being rearward of the wiping surfaces to engage mating contacts of another, mating connector, which mating contacts pass the wiping surfaces prior to engagement with the conductive surfaces, a conductive shield surrounding the mating end of the housing, the wiping surfaces being closer to the shield than the contacts, [An electrical connector as recited in claim 11, wherein,] the conductive [surface area] surfaces on each contact [is] being between edge margins on each contact, and the wiping surfaces [are] being offset from the conductive surface areas on the contacts, and [are] being in alignment with the edge margins on the contacts.

14. An electrical connector as recited in claim 11, wherein, an insulative divider separates one of the contacts from another of the contacts of each pair of the contacts.

15. (Amended) An electrical connector as recited in claim [14] 11, further comprising: an insulative divider separating one of the contacts from another of the contacts of each pair of the contacts, at least one conductive power contact having a pair of contact fingers on opposite sides of the divider, the contact fingers having a surface area sufficiently broad to radiate heat from electrical power dissipation, and the fingers extending parallel to the [signal] contacts.

16. An electrical connector as recited in claim 11, wherein, the wiping surfaces are interposed between the contacts and a front edge of the housing, and conductive shielding encircles the housing, a front edge of the shielding being closer to the front edge of the housing than the contacts.

17. An electrical connector as recited in claim 11, wherein, front tips of the contacts are recessed from a front edge of the housing, and the wiping surfaces are interposed between the tips of the contacts and the front edge of the housing.

18. An electrical connector as recited in claim 11, wherein, the wiping surfaces cover front tips of the contacts.

19. An electrical connector as recited in claim 11, wherein, the wiping surfaces are ramps.